APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,908	04/12/2004	Rina Panigrahy	00240	3555

26327	7590	05/17/2005	

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EXAMINER
PHUNKULH, BOB A

ART UNIT	PAPER NUMBER
2661	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

<table>
<tr><td rowspan="2">Office Action Summary</td><td>Application No.</td><td>Applicant(s)</td></tr>
<tr><td>10/822,908</td><td>PANIGRAHY ET AL.</td></tr>
<tr><td></td><td>Examiner</td><td>Art Unit</td><td></td></tr>
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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 April 2004*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 7-13, 16-20, 22-23, 25-27, 29-33 are rejected under 35

U.S.C. 102(e) as being anticipated by Alasti et al. (US 6757246), hereinafter Alasti.

Regarding claim 1, Alasti discloses a method comprising:

for each input of a plurality of inputs of a switch (a plurality input ports 20, see

figure 1):

generating a request to send a packet to one of a plurality of outputs of the

switch from said input, said generating the request including weighted randomly

selecting one of the plurality of outputs of the switch to which said input has a packet to

send (generate a request for each received packet, see step 310 figure 3 and see col. 3

lines 1-8);

granting one of said requests for each different one of the plurality of outputs for

which one or more of said requests were generated (generate grants based on requests

for the link, step 330, see figure 3); and

sending packets between said inputs and said outputs corresponding to said

granted requests.

Regarding claim 2, Alasti discloses a round (within a given time slot) consisting of

said generating the request, said granting one of said requests, and said sending

packets is performed at least two times per packet time (a given time slot), said packet

time corresponding to the amount of time allocated to receive a packet at an input of the

switch from an external source (a given time slot, arbitration can be performed multiple

times iteratively within a given time slot, see col. 7 lines 1-9).

Regarding claim 3, Alasti discloses configuring the switch to setup connections

between said inputs and said outputs corresponding to said granted requests prior to

said sending packets (see figures 6-7).

Regarding claim 4, Alasti discloses the granting one of said requests includes

randomly selecting one of said requests for each of the plurality of outputs for which one

or more of said requests were generated (see col. 6 lines 6-17; lines 27-34).

Regarding claim 7, Alasti discloses the weighted random selection (weighted

values) is weighted based on the last times packets were sent from a corresponding

input of the plurality of inputs to each of the plurality of outputs (the weight value

indicates the extent to which a given link is given priority over other links where that

priority increases over time until the link is serviced, where after the services, the weight value is updated, see col. 4 lines 28-54 and figure 7).

Regarding claim 8, Alasti discloses the weighted random selection is weighted based on classes of service (Quality Of Service) associated with packets to send to each of the plurality of outputs by a corresponding input of the plurality of inputs (see col. 3 lines 47-52, col. 4 lines 28-54).

Regarding claim 9, Alasti discloses (c) the last times packets were sent from a corresponding input of the plurality of inputs to each of the plurality of outputs, and (d) classes of service associated with packets to send to each of the plurality of outputs by a corresponding input of the plurality of inputs (the weight value indicates the extent to which a given link is given priority over other links where that priority increases over time until the link is serviced, where after the services, the weight value is updated, see col. 4 lines 28-54 and figure 7; and col. 3 lines 47-52).

Regarding claim 10, Alasti discloses one or more rounds of generating requests by weighted randomly selecting among all or a subset of the plurality of outputs, and selectively granting said requests corresponding to available bandwidth after said generating the requests for each input and said granting one of said requests and before said sending packets (col. 7 lines 1-9).

Regarding claim 11, Alasti discloses an apparatus (scheduler 140, figure 2),

comprising:

a plurality of request generators (although request generator 210 is only one

device, it functions the same since it generate requests for input ports 120, see figure

2);

one or more grant arbiters (grant arbiters 1-N, see figure 2) coupled to the

plurality of request generators;

wherein each of the plurality of request generators is configured to weighted

randomly generate a request for its associated input of a plurality of inputs of a switch

(cross bar switch 110, figure 1), the request including a weighted random selection of

one of a plurality of outputs of the switch (output ports 130, see figure 1); wherein

said one or more grant arbiters are configured to grant requests received from

the plurality of request generators such that one request for each requested output is

granted (see col. 6 lines 6-17); and

wherein the plurality of inputs are configured to send packets corresponding to

said granted requests (see figures 6-7).

Regarding claim 12, Alasti discloses a control to configure the switch to setup

connections between said inputs and said outputs corresponding to said granted

requests (the scheduler 140 is connected to the crossbar switch 110 for connection

between the inputs and outputs corresponding granted requests, see figures 1, 6-7).

Regarding claim 13, Alasti discloses one or more grant arbiters randomly select a request to grant for a particular output from said requests received for the particular output (see col. 6 lines 6-17; lines 27-34).

Regarding claim 16, Alasti discloses the weighted random selection (weighted values) is weighted based on the last times packets were sent from a corresponding input of the plurality of inputs to each of the plurality of outputs (the weight value indicates the extent to which a given link is given priority over other links where that priority increases over time until the link is serviced, where after the services, the weight value is updated, see col. 4 lines 28-54 and figure 7).

Regarding claim 17, Alasti discloses the weighted random selection is weighted based on classes of service (Quality Of Service) associated with packets to send to each of the plurality of outputs by a corresponding input of the plurality of inputs (see col. 3 lines 47-52, col. 4 lines 28-54).

Regarding claim 18, Alasti discloses (c) the last times packets were sent from a corresponding input of the plurality of inputs to each of the plurality of outputs, and (d) classes of service associated with packets to send to each of the plurality of outputs by a corresponding input of the plurality of inputs (the weight value indicates the extent to which a given link is given priority over other links where that priority increases over

time until the link is serviced, where after the services, the weight value is updated, see

col. 4 lines 28-54 and figure 7; and col. 3 lines 47-52).

Regarding claim 19, Alasti disclose the plurality of inputs are configured to send

packets from their respective virtual output queues corresponding to said granted

requests (the plurality of inputs are configured sent packets from their respective virtual

queues, see figure 6).

Regarding claim 20, Alastid discloses the apparatus includes a plurality of line

cards (input ports 1-4, each having a plurality of queues, see figure 6) and a switching

board including the switch (crossbar switch 110, see figure 1), and wherein said virtual

output queues are located on the line cards (see figures 6-7).

Regarding claim 22, Alasti discloses an apparatus comprising:

means for generating requests to send packets to outputs of a switch from input

inputs of the switch, said means for generating said requests including means for

weighted randomly selecting, for each of said inputs having a packet to send, one of

said outputs of the switch to which said input has a packet to send (as shown in figure 2

the scheduler 140 comprises of a request generator 210 for generating the requests as

the plurality of inputs receive packets, see figures 2 and 3);

means for granting one of said requests for each different one of the plurality of

outputs for which one or more of said requests were generated (also as shown in figure

2 the scheduler 140 comprises of a plurality of grant arbiters 220 for granting the

requests, see figure 2 and col. 6 lines 6-18, 27-34); and

means for sending packets between said inputs and said outputs corresponding

to said granted requests (see figures 6-7).

Regarding claim 23, Alasti discloses the apparatus means for configuring the

switch to setup connections between said inputs and said outputs corresponding to said

granted requests prior to said sending packets (the scheduler 140 includes means for

configuring the switch to setup connections between the input and outputs, see figures

2-3, 6-7).

Regarding claim 25, Alasti discloses the weighted random selection (weighted

values) is weighted based on the last times packets were sent from a corresponding

input of the plurality of inputs to each of the plurality of outputs (the weight value

indicates the extent to which a given link is given priority over other links where that

priority increases over time until the link is serviced, where after the services, the weight

value is updated, see col. 4 lines 28-54 and figure 7).

Regarding claim 26, Alasti discloses the weighted random selection is weighted

based on classes of service (Quality Of Service) associated with packets to send to

each of the plurality of outputs by a corresponding input of the plurality of inputs (see

col. 3 lines 47-52, col. 4 lines 28-54).

Regarding claims 27, 32 , Alasti discloses a method for scheduling packets, the method comprising:

for each particular input of a plurality of inputs: generating a first request including weighted randomly selecting one of a plurality of outputs (see step 310, figure 3);

granting one of said first requests of the plurality of outputs for each different one of the plurality of outputs for which one or more of said first requests was generated (see step 330, figure 3);

for each particular input of the plurality of inputs whose first request was not granted: generating a second request including weighted randomly selecting one of the plurality of outputs (see col. 7 lines 1-9); and

granting one of said second requests of the plurality of outputs for each different one of the plurality of outputs not already having a corresponding first request granted and for which one or more of said second requests was generated (see col. 7 lines 1-9).

Regarding claim 29, Alasti discloses packets are sent between said inputs and said outputs based said granted first and second requests (see col. 7 lines 1-9 and figures 6-7).

Regarding claim 30, Alasti discloses only two request phases are performed per packet time, said two request phases consisting of said generating said first requests

and said generating said second requests, said packet time corresponding to the

amount of time allocated to receive a packet at an input from an external source (see

col. 7 lines 1-9).

Regarding claims 31 and 33, Alasti discloses each particular request to grant of

said first requests and said second requests for each particular output is randomly

selected from all the respective said first requests or said second request for said

particular output (see col. 7 lines 1-9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

Claims 5-6, 14-15, 24, 28, 34, are rejected under 35 U.S.C. 103(a) as being

unpatentable over Alasti in view of Oba et al. (US 6,262,986), hereinafter Oba.

Regarding claims 5-6, 14-15, 24, 28, 34, Alasti fails to explicitly disclose

determining a weight based on a number of packets/bytes to send to each of said

outputs by a corresponding input.

Oba, on the other hand, discloses determining a weight based on a number of

packets/bytes to send to each of said outputs by a corresponding input (see col. 2 lines

3-13).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention was made implement the teaching of Oba in the system taught y Alasti in order to implement fair queuing scheduling among a plurality of input ports.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alasti.

Regarding claim 21, Alasti fails to explicitly disclose the virtual output queues are located on the switching board.

However, it would have been obvious to one having ordinary skill in the art at the time of invention was made modify the Alasti by putting the plurality of queues as part of the crossbar switch 110 for choice of design.

Conclusion

Any response to this action should be mailed to:

> The following address mail to be delivered by the United States Postal Service (USPS) only:
>
> Mail Stop _____
> Commissioner for Patents
> P. O. Box 1450
> Alexandria, VA 22313-1450
>
> **or faxed to:**
>
> (703) 872-9306, (for formal communications intended for entry)
>
> **Or:**
>
> The following address mail to be delivered by other delivery services (Federal Express (Fed Ex), UPS, DHL, Laser, Action, Purolater, Hand Delivery, etc.) as follow:

U.S. Patent and Trademark Office
220 20th Street South
Customer Window, Mail Stop _____
Crystal Plaza Two, Lobby, Room 1B03
Arlington, VA 22202.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to **Bob A. Phunkulh** whose telephone number is **(571)**

272-3083. The examiner can normally be reached on Monday-Tursday from 8:00 A.M.

to 5:00 P.M. (first week of the bi-week) and Monday-Friday (for second week of the bi-

week).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor **Chau Nguyen**, can be reach on **(571) 272-3126.** The fax phone number for

this group is **(703) 872-9306.**

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Bob A. Phunkulh

TC 2600
Art Unit 2661
May 13, 2005

BOB PHUNKULH
PRIMARY EXAMINER